City of Richmond

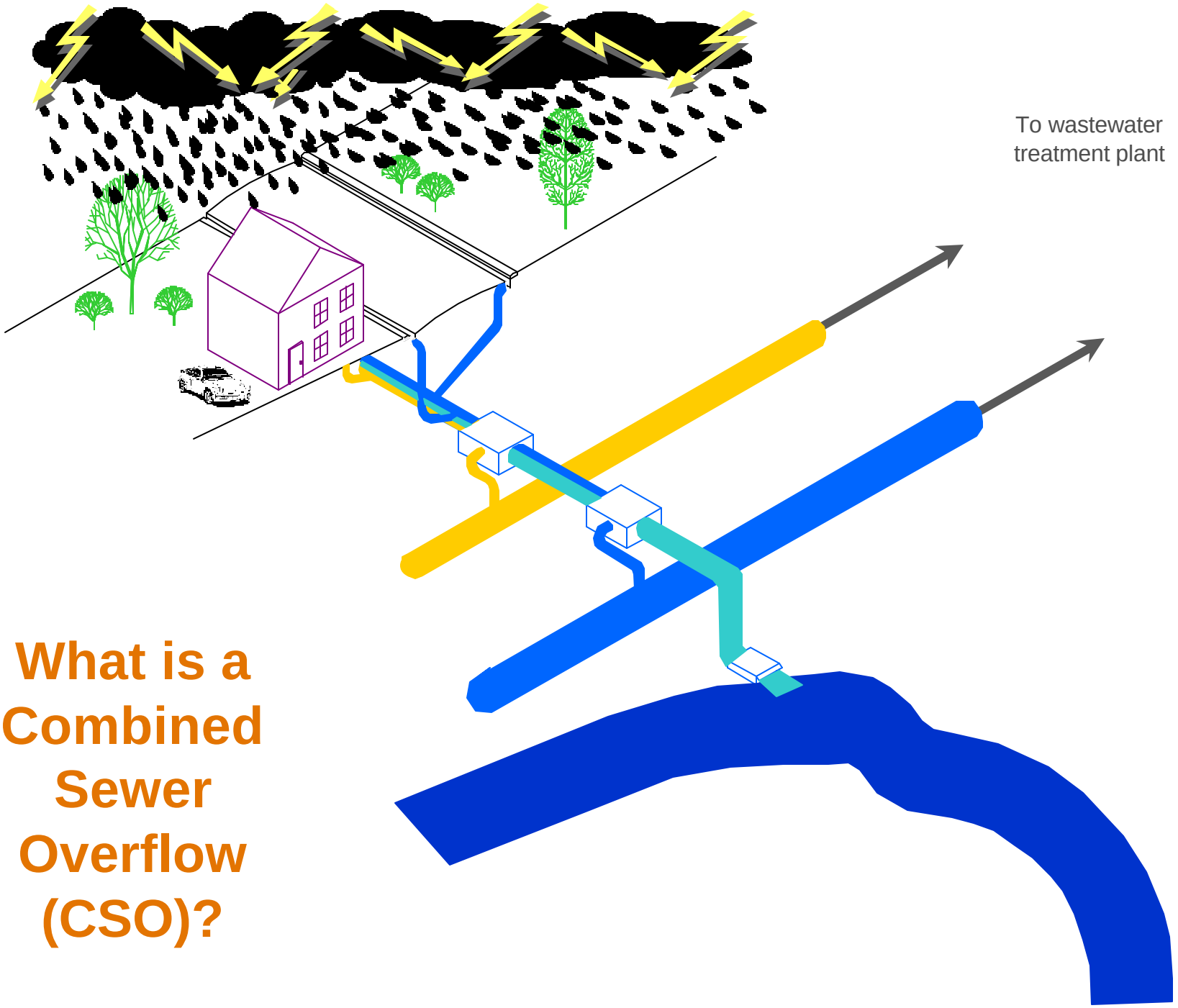
GREELEY AND HANSEN

City of Richmond CSO Control Program

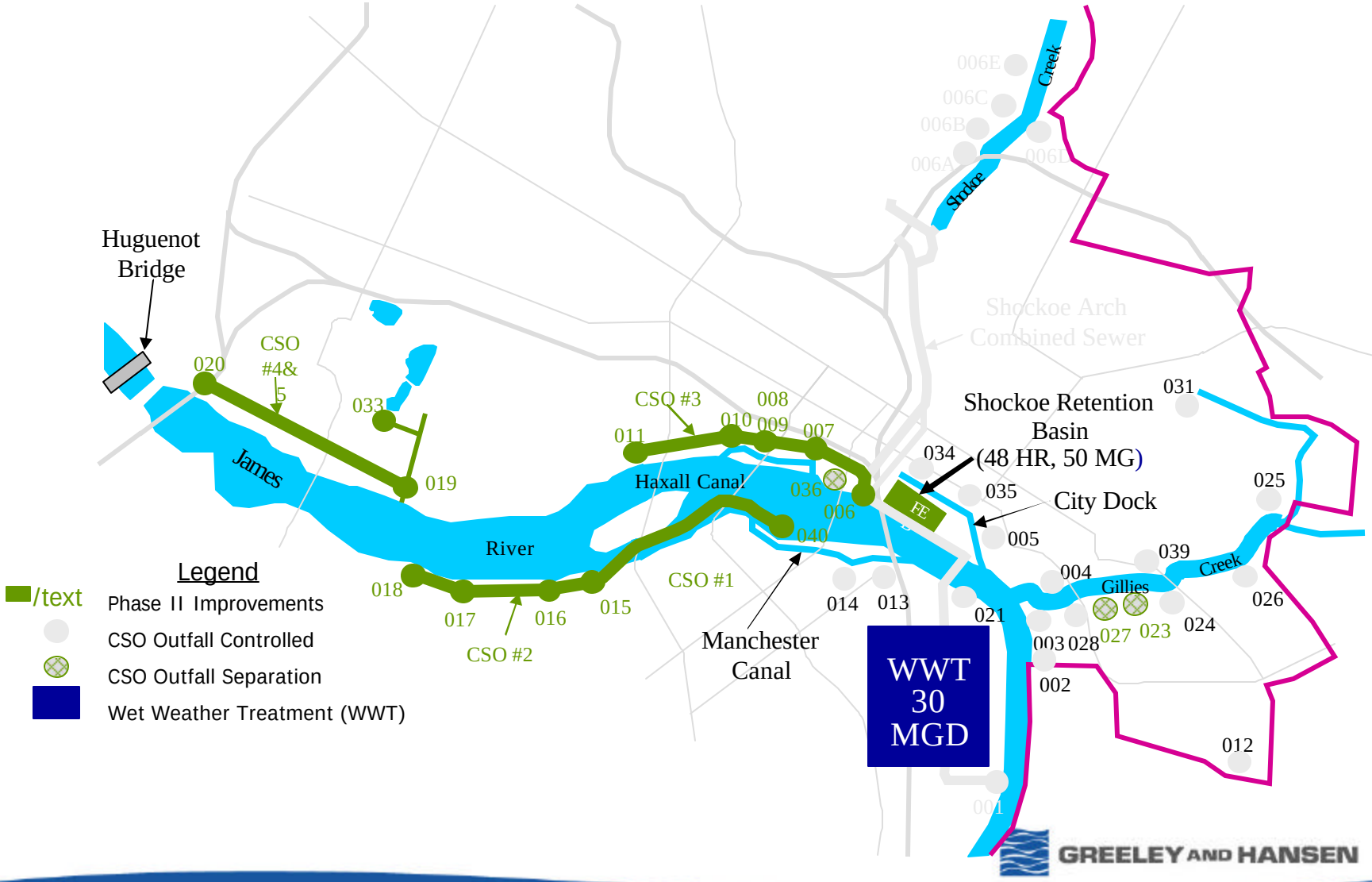
Richmond CSO Long-Term Control Plan

Wednesday, June 30, 2010

What is a Combined Sewer Overflow (CSO)?



Richmond's CSO Control Plan
After Phase II Improvements



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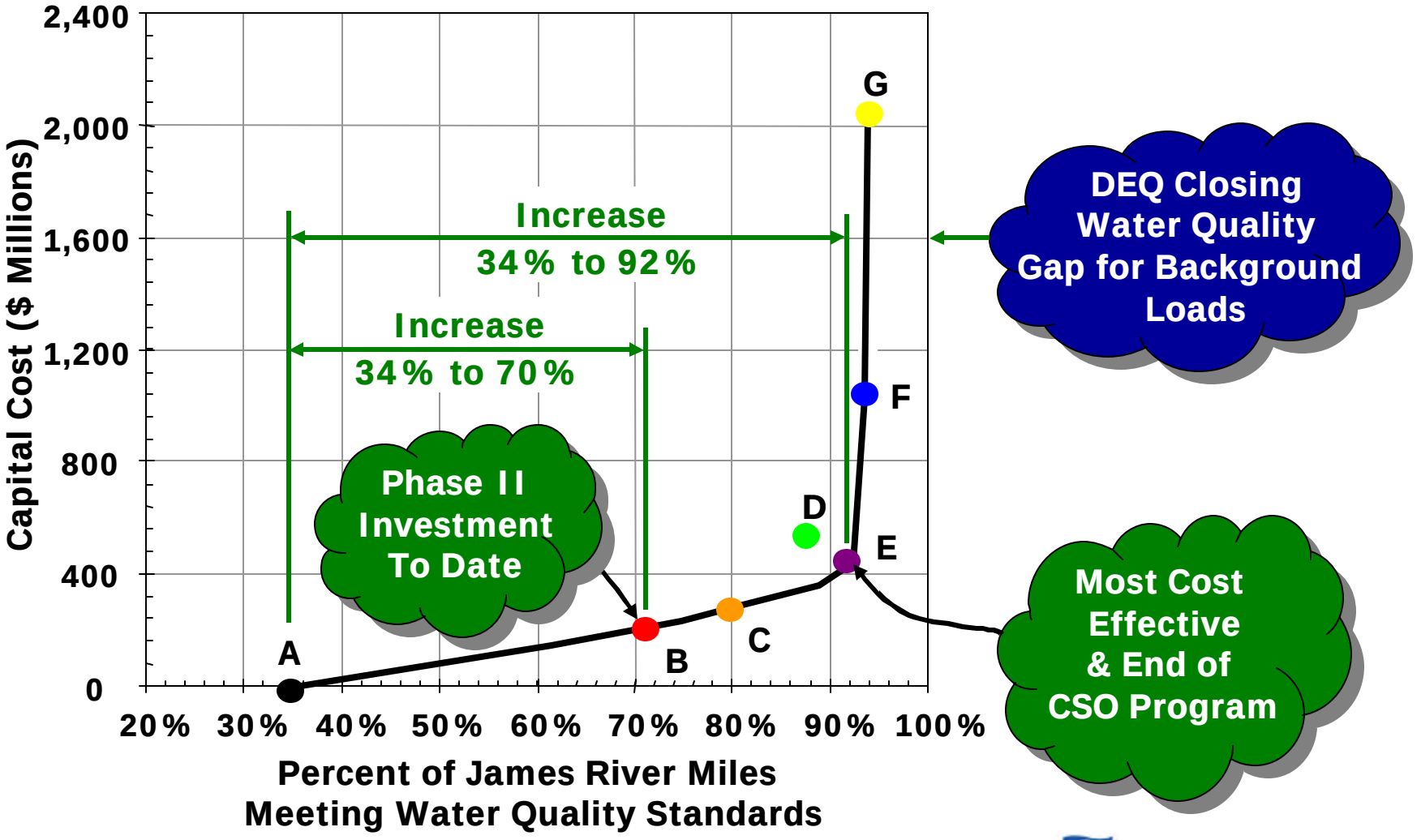
LTCP Re-Evaluation Results

Percent of James River Miles Meeting Fecal Coliform WQS



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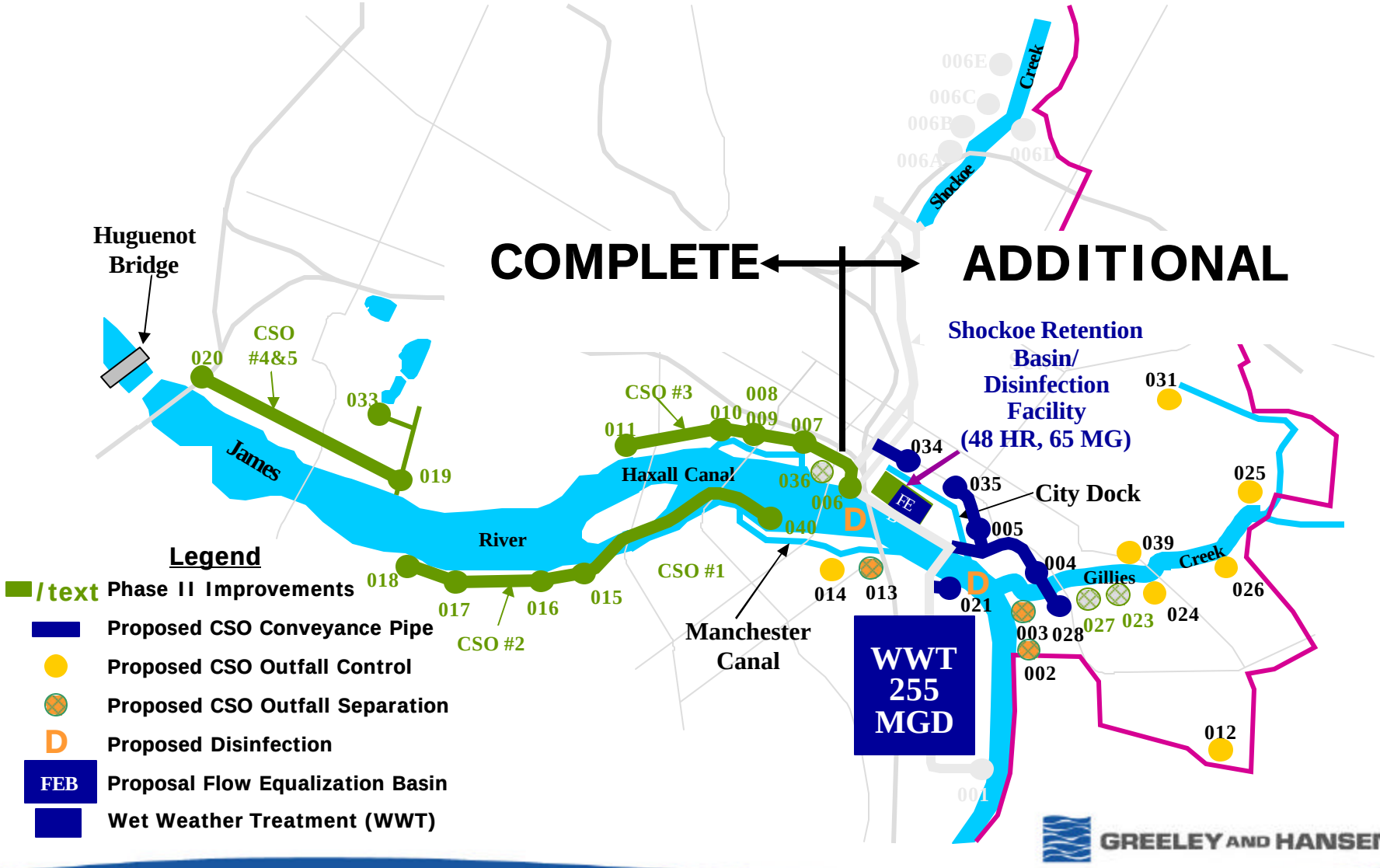
Richmond's CSO Control Plan
After Phase III Improvements



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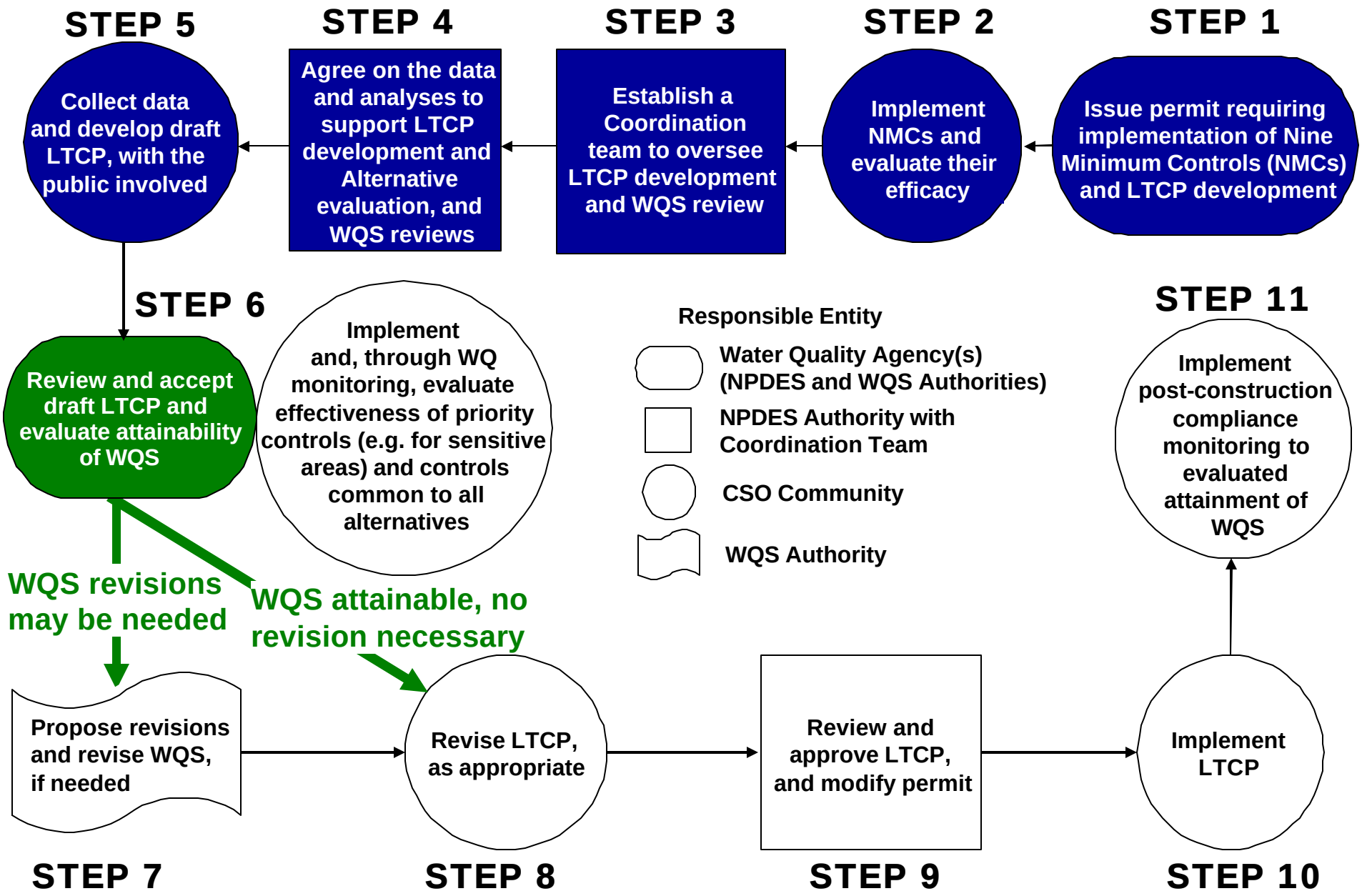
Water Quality Standards Coordination Process



Water Quality Standards Coordination Process
James River Bacteria TMDL

- **James River**
  - **Riverine Segment**
  - **Tidal Segment**

Alternative "E" will meet 126 GM WQS

- **Almond Creek**
- **Gillies Creek**

Additional Evaluation Needed During IP

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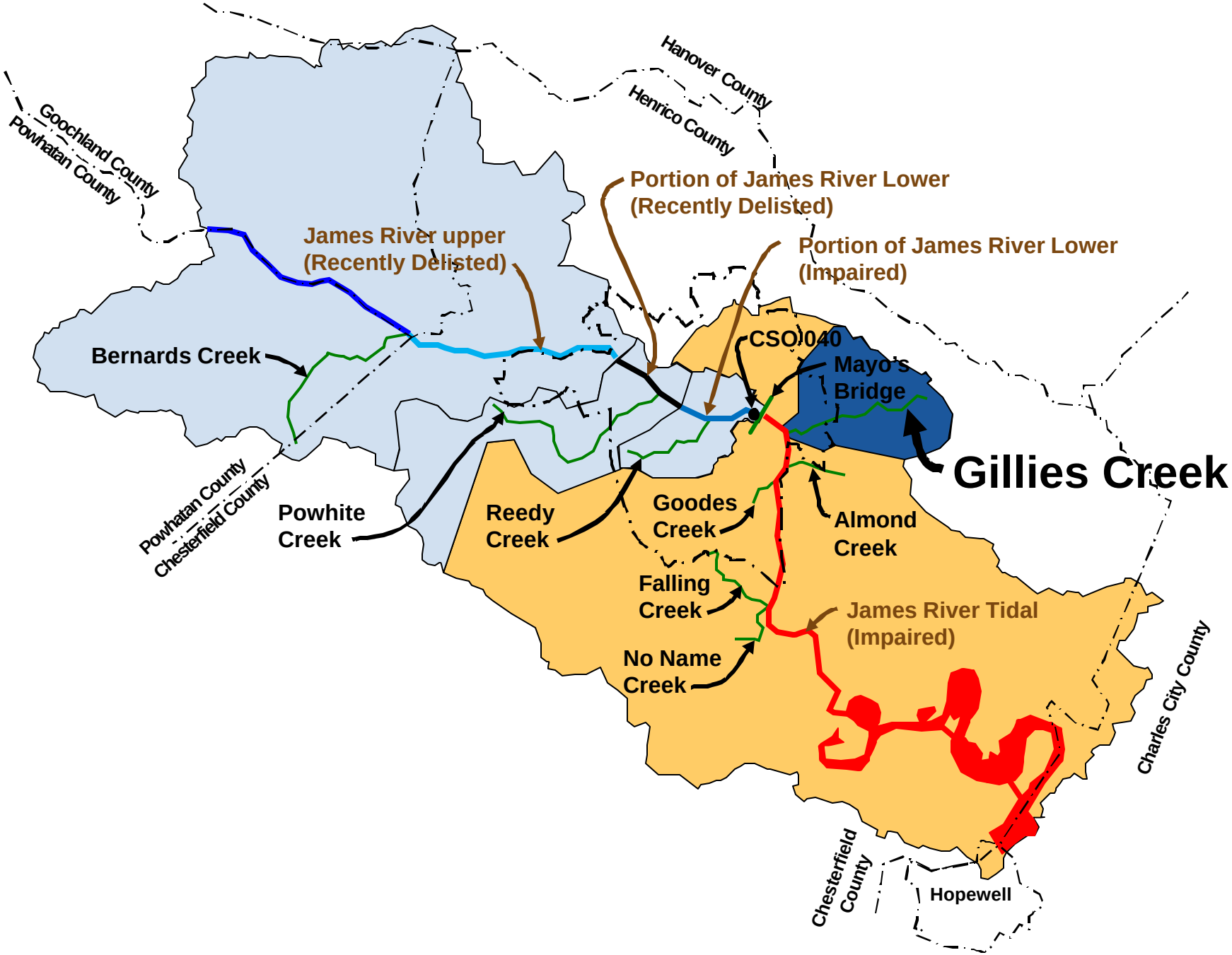
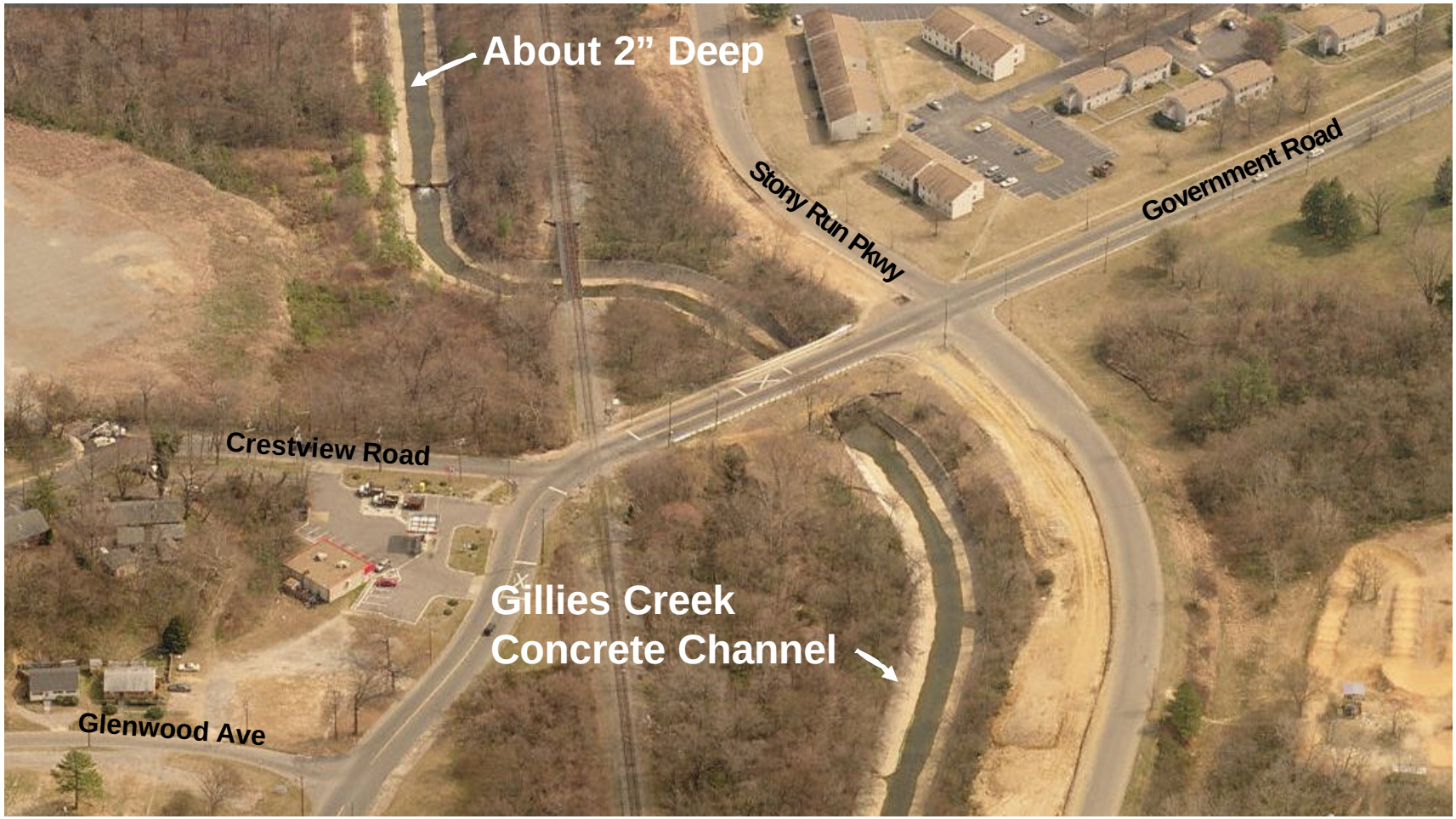

Hanover County
Henrico County
Goochland County
Powhatan County
Portion of James River Lower
(Recently Delisted)
James River upper
(Recently Delisted)
Portion of James River Lower
(Impaired)
CSO040
Mayo's
Bridge
Gillies Creek
Bernards Creek
Powhatan County
Chesterfield County
Powhite
Creek
Reedy
Creek
Goodes
Creek
Almond
Creek
Falling
Creek
James River Tidal
(Impaired)
No Name
Creek
Charles City County
Chesterfield
County
Hopewell

Gillies Creek Concrete Channel

Picture 1
Gillies Creek at City Border

Picture 2
Gillies Creek at Government Road



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Picture 3
Gillies Creek at James River

Gillies Creek

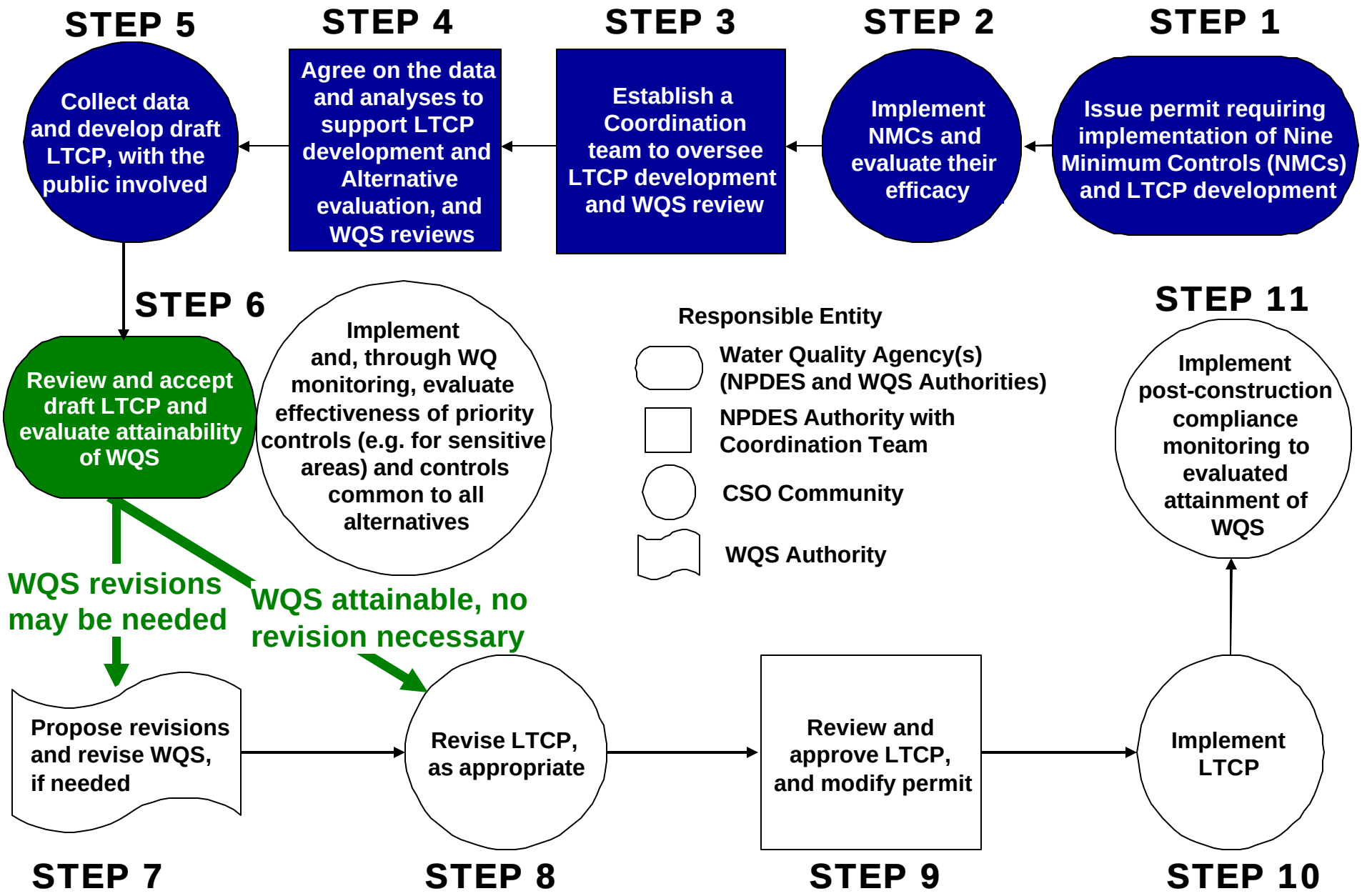
Percent Reductions to Existing Bacteria Loads

Percent Reductions to Existing Bacteria Loads						
Scenario	Livestock Direct	Agricultural Land Based Cropland, Pasture, LAX	Human Direct Straight Pipes	Human and Pet Land Based LMIR	City of Richmond CSO Program Project Plan Scenario	VADEQ *E. coli* Standard percent violations >126 GM
1	0	0	0	0	Existing	95.00
6	0	0	100	94	Alternative E	15.00
7	0	0	100	94	Alternative E and a 95% reduction	0.00
9a/9b	0	0	100	97	Alternative E and a 73% reduction	0.0 >630 GM
10	0	0	0	0	Alternative E and 5MG storage	65.0
11	0	0	100	94	Alternative E and 5MG storage	3.33

Next Steps

- **TMDL Implementation Plan**
  - **Evaluate James River at the confluence with Gillies Creek**
  - **Evaluate Storage Achieved by New CSO Solids and Floatable Control Regulators along Gillies Creek**
  - **Evaluate additional monitoring data (not limited to only Gillies Creek)**
- **Use Attainability Analysis**
- **Complete Water Quality Standards Coordination Process**

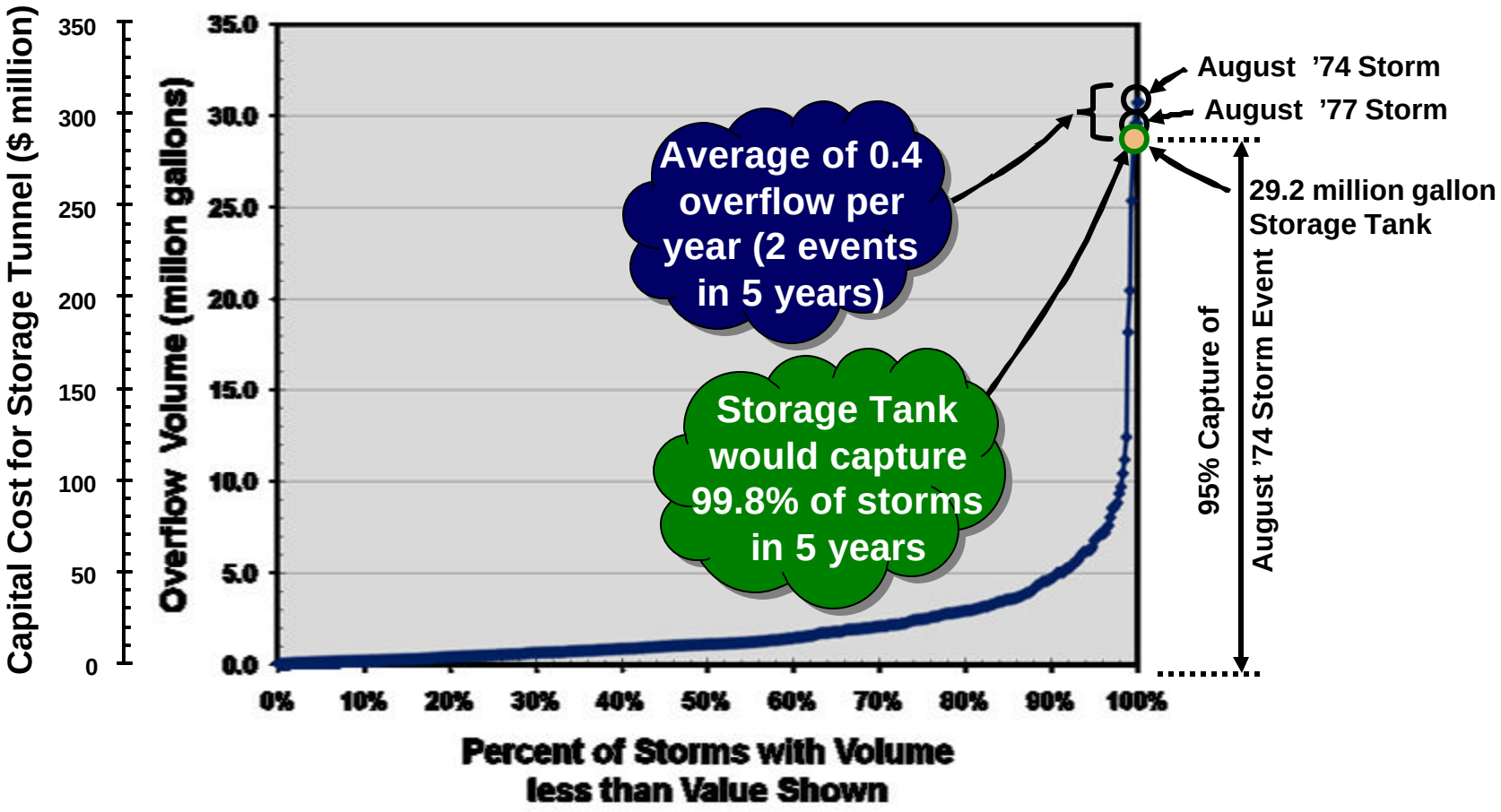
Water Quality Standards Coordination Process



Discussion

Gillies Creek

Primary Contact: Bacteria Reduction at 95%



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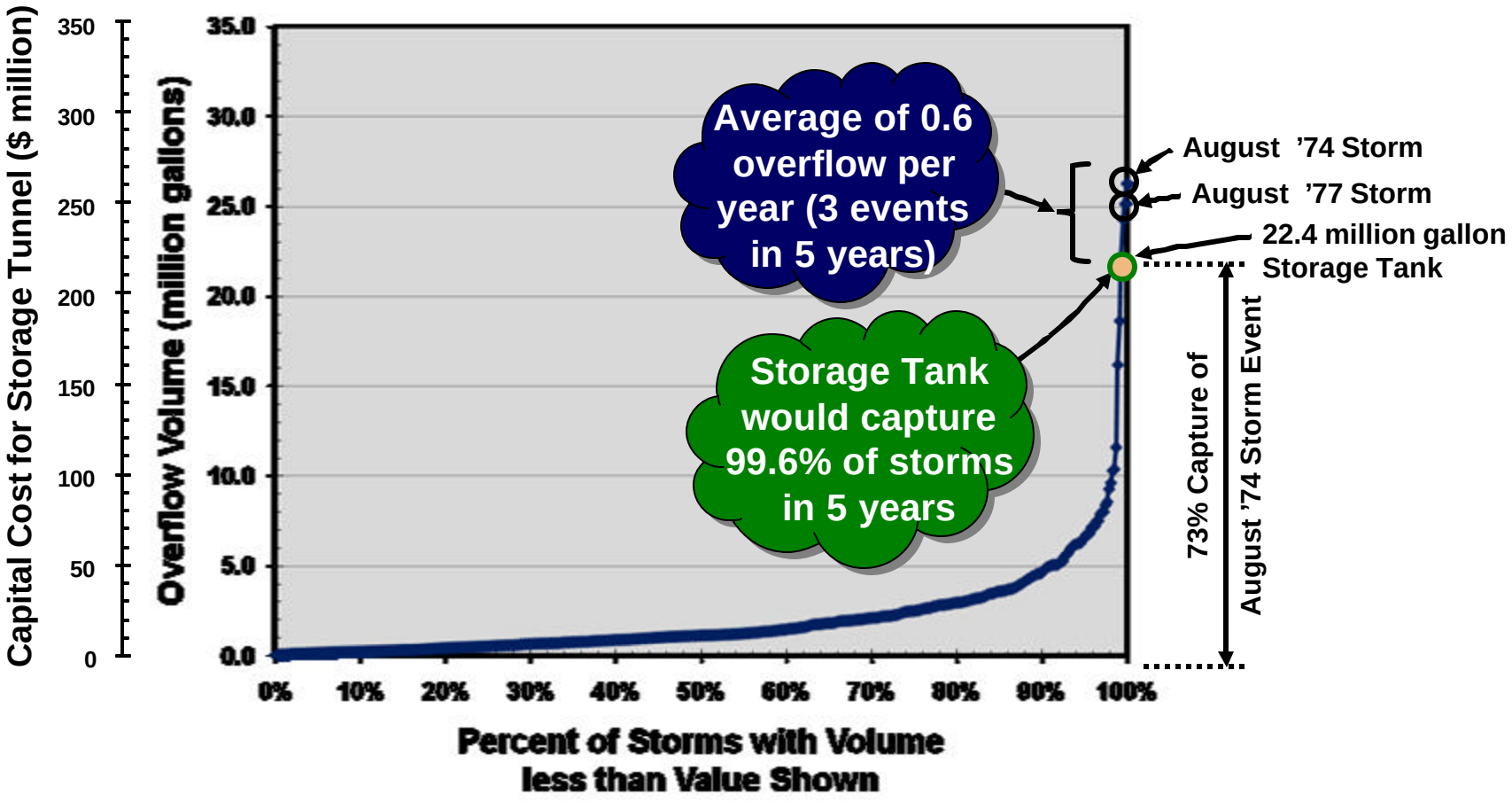
Gillies Creek

Secondary Contact: Bacteria Reduction at 73%



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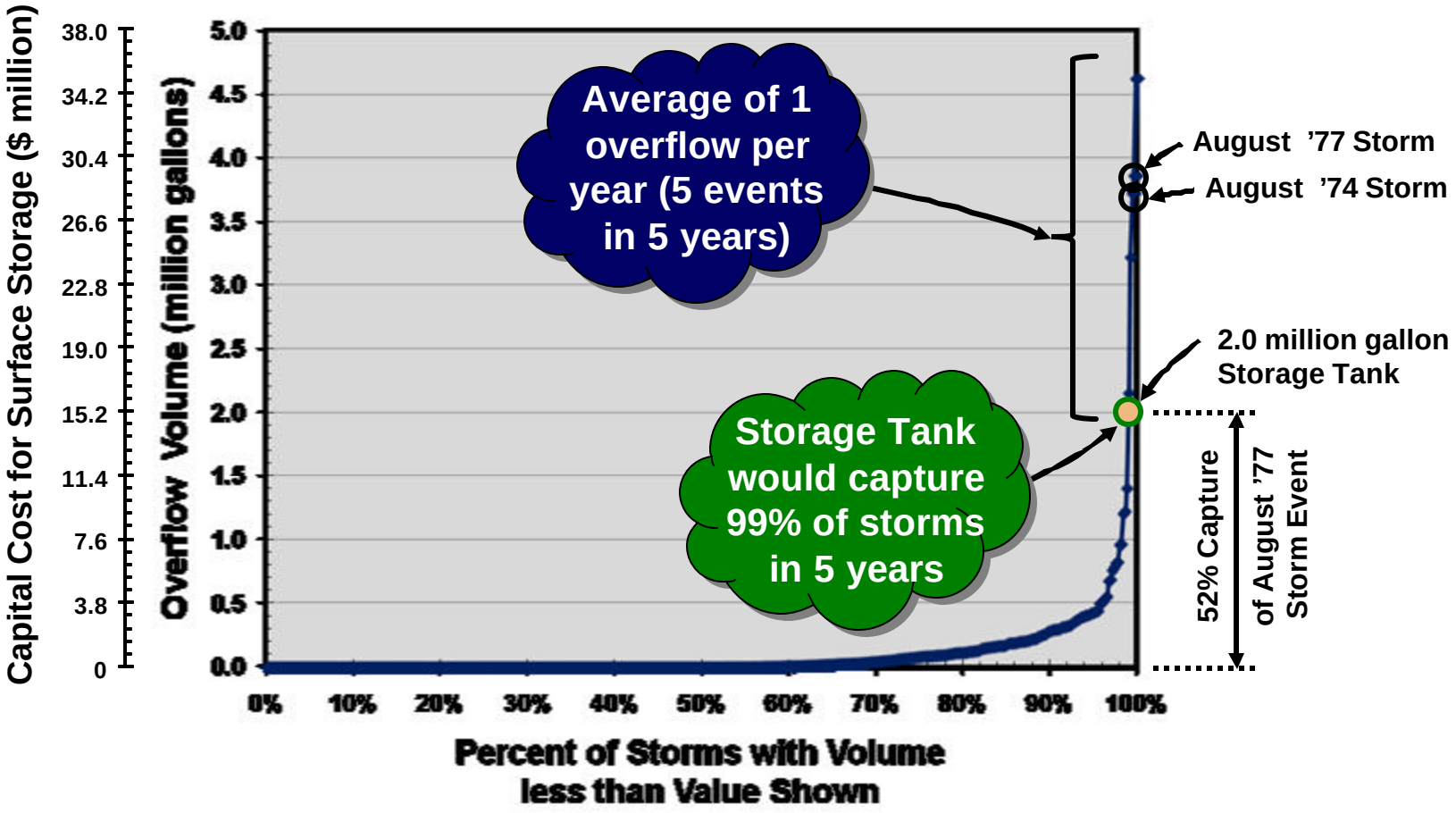
Almond Creek

Primary Contact: Bacteria Reduction at 52%



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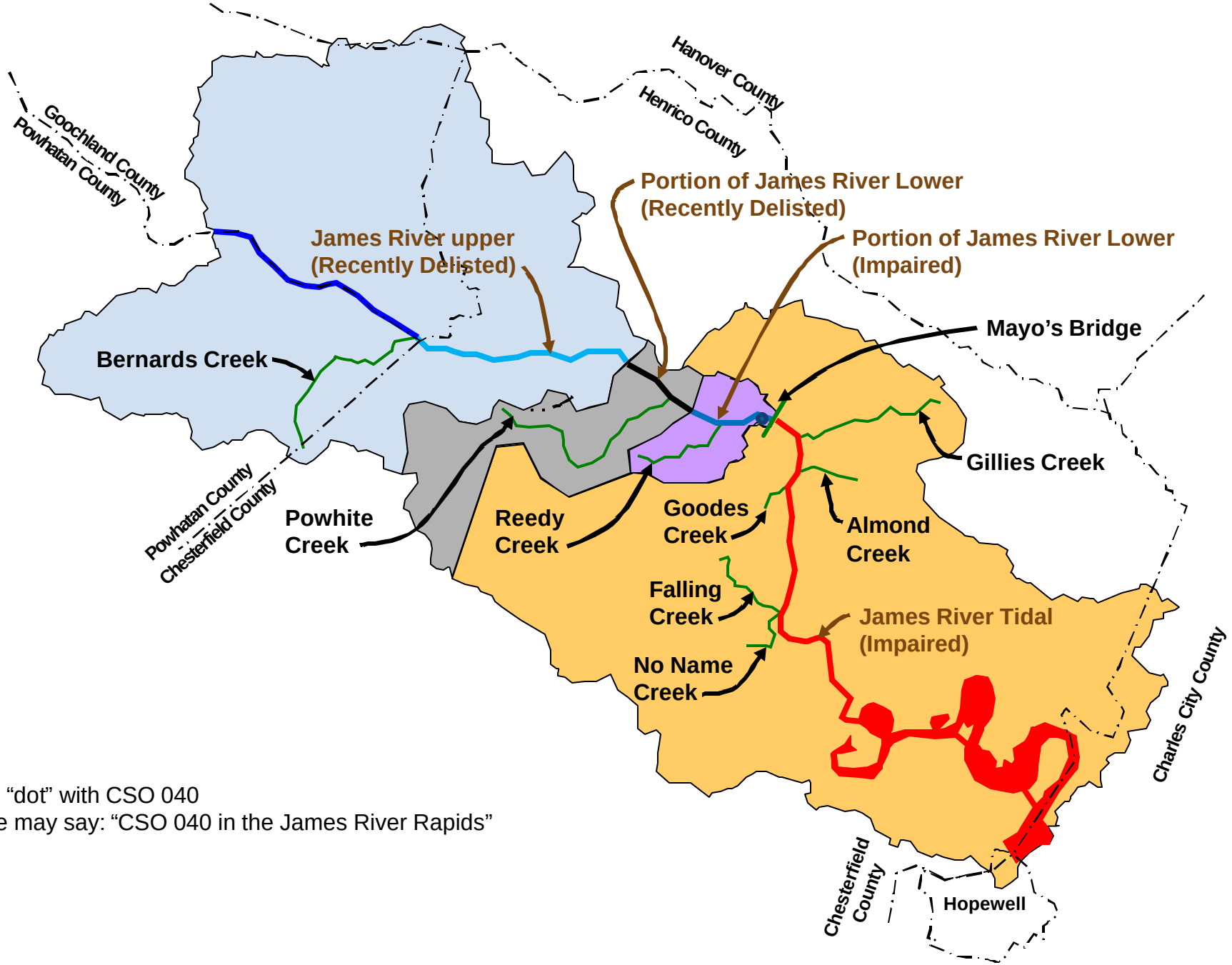
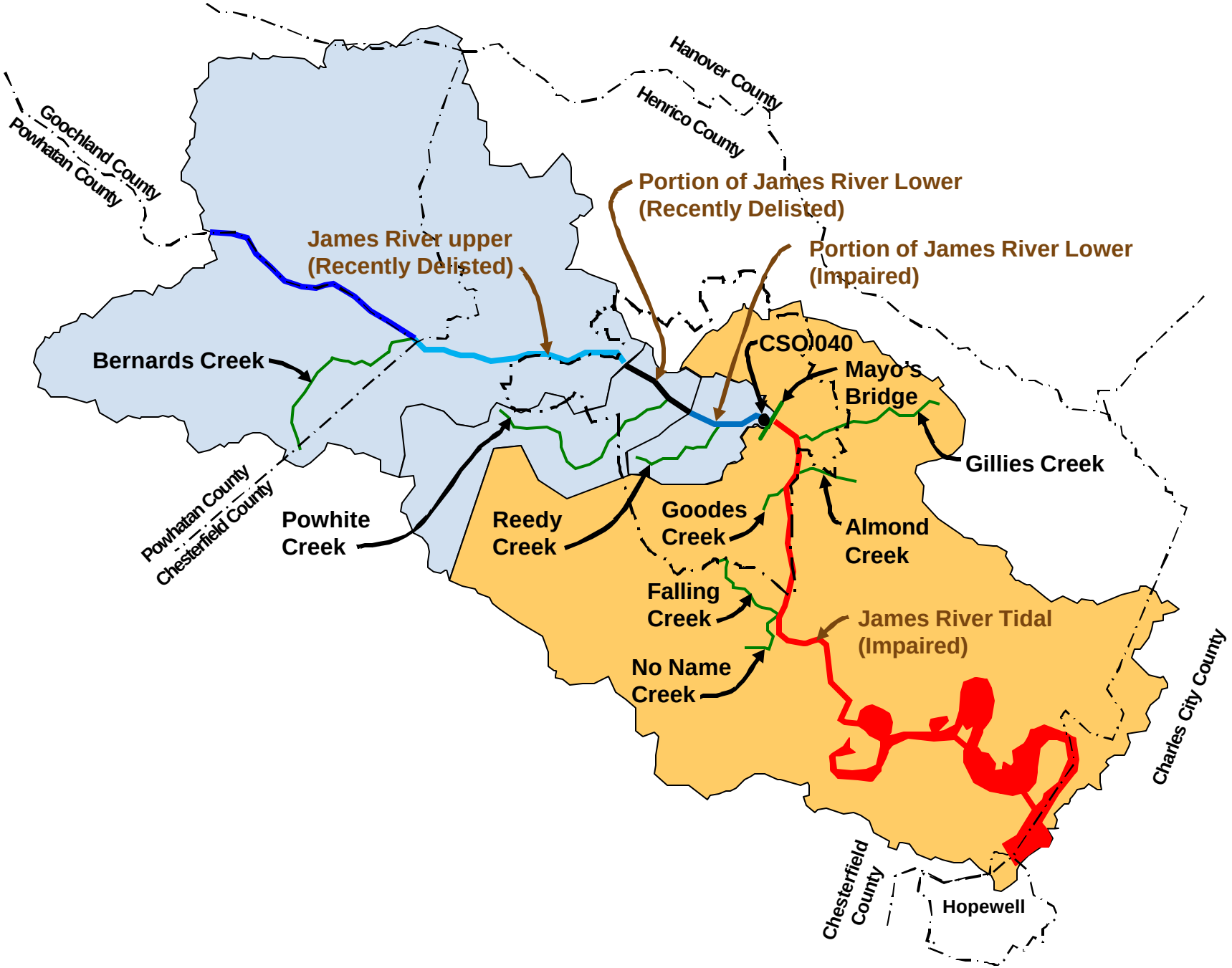
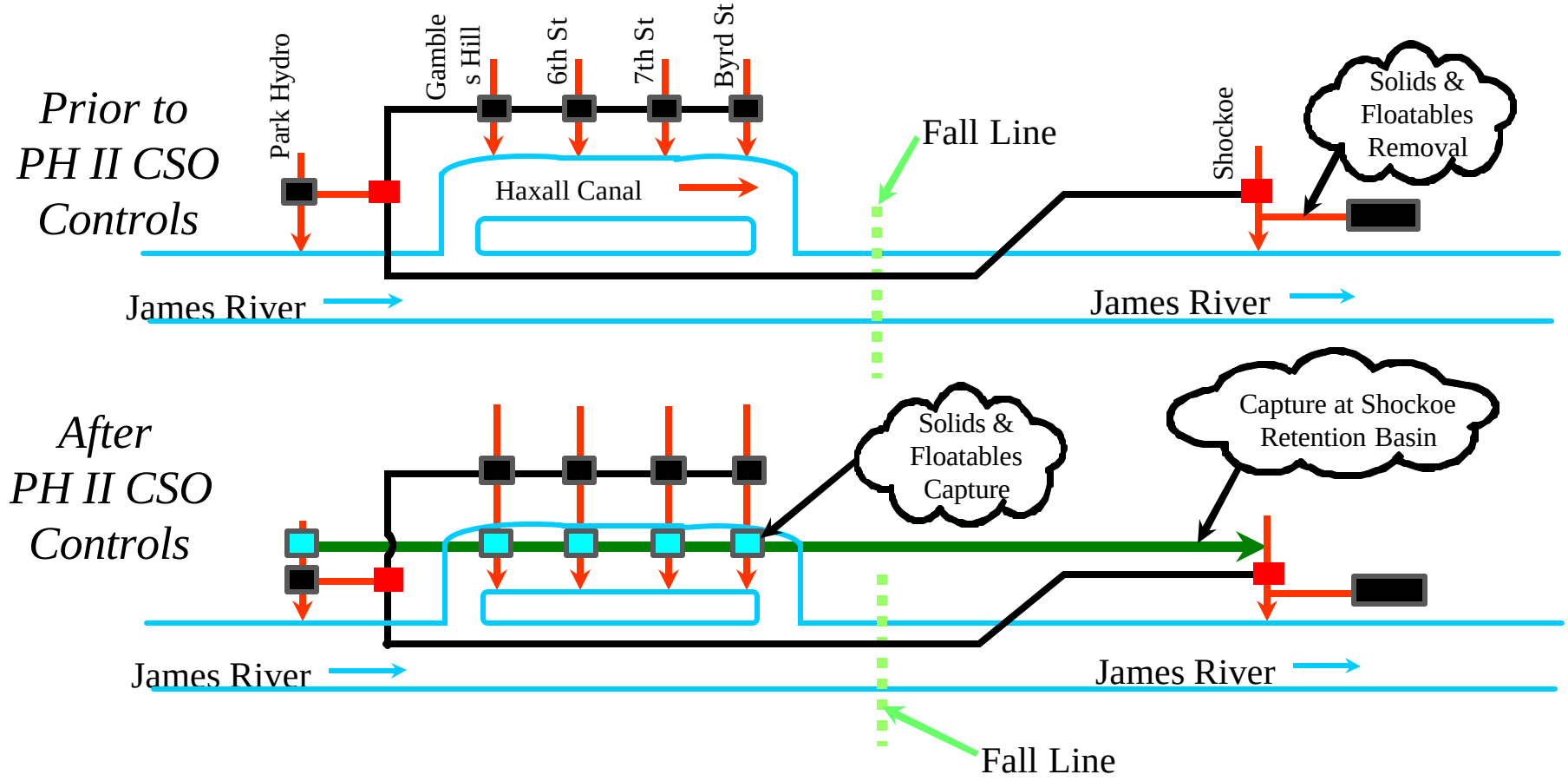


Add "dot" with CSO 040
Note may say: "CSO 040 in the James River Rapids"


Hanover County
Henrico County
Goochland County
Powhatan County
Portion of James River Lower
(Recently Delisted)
James River upper
(Recently Delisted)
Portion of James River Lower
(Impaired)
CSO 040
Mayo's
Bridge
Bernards Creek
Gillies Creek
Powhatan County
Chesterfield County
Powhite
Creek
Reedy
Creek
Goodes
Creek
Almond
Creek
Falling
Creek
James River Tidal
(Impaired)
No Name
Creek
Charles City County
Chesterfield
County
Hopewell

North Side James River CSO Controls



Performance

- Removes CSOs from sensitive areas
- Reduces CSO loads downriver
- Increases CSO treatment

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Gambles Hill CSO Outfall

Before and After CSO Control (1996)

Before (1996)

After (1998)

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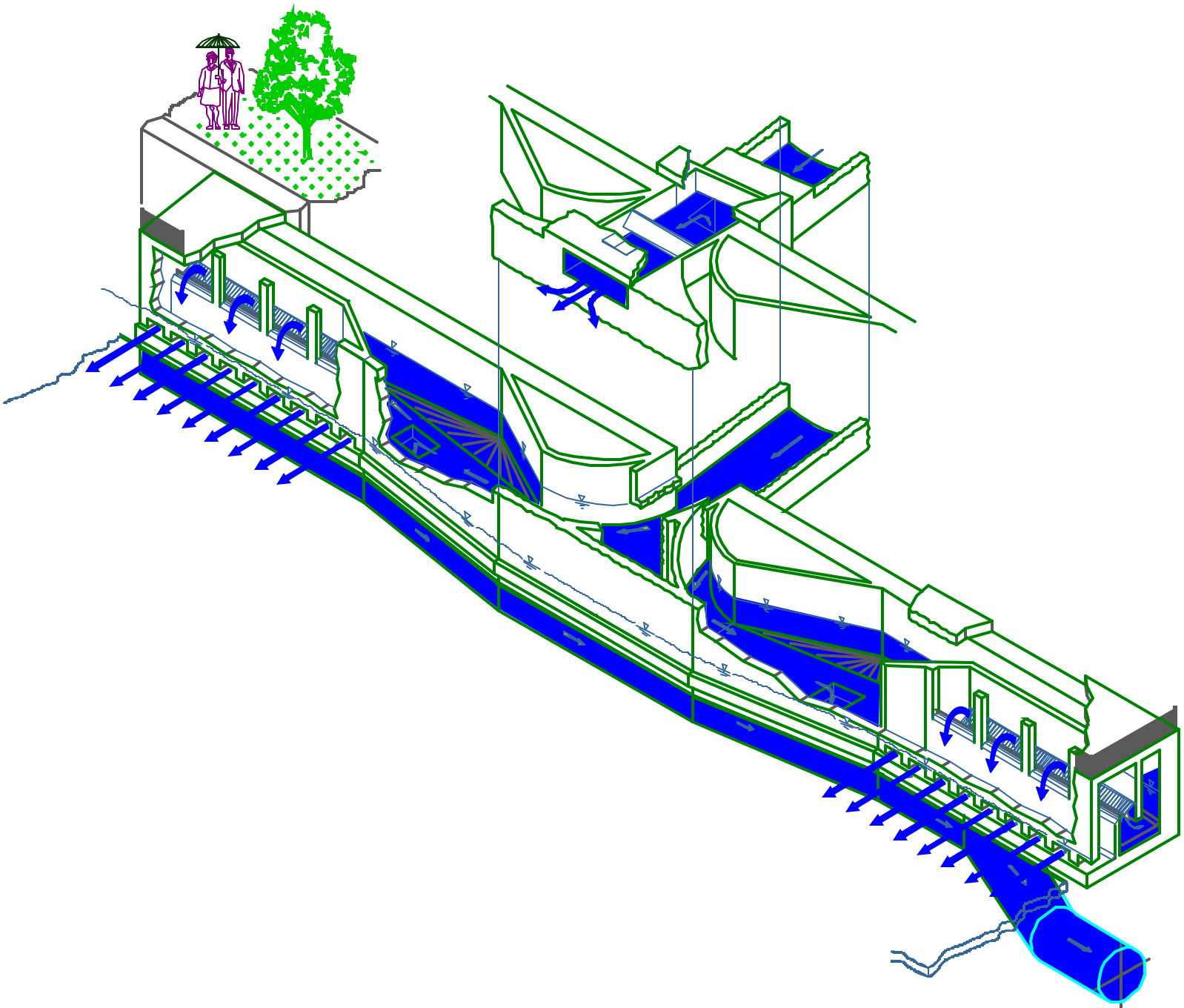

GAMBLES HILL WET WEATHER FLOW REGULATOR